

CLAIMS

Having thus described our invention in detail, what we claim as new and desire to secure by the Letters Patent is:

1. A thin film resistor comprising:

at least two resistor materials located over one another, each resistor material having a different temperature coefficient of resistivity wherein the different temperature coefficients of resistivity provide an effective temperature coefficient of resistivity that is substantially 0 ppm/°C.

2. The thin film resistor of Claim 1 further comprising an insulating material located between portions of the two resistor materials.

3. The thin film resistor of Claim 2 wherein the insulating material includes outermost edges that do not extend beyond outermost edges of the at least two resistor materials.

4. The thin film resistor of Claim 1 wherein the at least two resistor materials are different materials selected from the group consisting of Ta, TaN, Ti, TiN, W, and WN.

5. The thin film resistor of Claim 1 wherein the at least two resistor materials comprise a first resistor material and a second resistor material.

6. The thin film resistor of Claim 5 wherein the first resistor material is TaN and the second resistor material is TiN.

7. The thin film resistor of Claim 1 wherein one of the at least two resistor materials is located on a surface of a semiconductor substrate or a dielectric material.

8. The thin film resistor of Claim 1 wherein the thin film resistor has an overall resistance that is equivalent to at least two resistors that are connected in parallel.
9. The thin film resistor of Claim 1 further comprising an adjacent metal-insulator-metal capacitor which comprises a bottom plate electrode and a top plate electrode wherein the bottom plate electrode comprises one of the resistor materials of the thin film resistor, while the top plate electrode comprises another resistor material of the thin film resistor.
10. The thin film resistor of Claim 1 wherein the at least two resistor materials are contained with the same interlevel of an interconnect structure.
11. A method of fabricating a thin film resistor comprising:
- forming at least two resistor materials over one another, each resistor material having a different temperature coefficient of resistivity wherein the different temperature coefficients of resistivity provide an effective temperature coefficient of resistivity that is substantially 0 ppm/°C; and
- patterning the at least two resistor materials to provide a thin film resistor having a selected dimension.
12. The method of Claim 11 further comprising forming a patterned insulating material between a portion of the at least two resistor materials.
13. The method of Claim 11 further comprising connecting the at least two resistor materials to wiring levels of an interconnect structure.
14. The method of Claim 13 wherein the connecting occurs through metal vias and lines.

15. A method integrating a thin film resistor with a metal-insulator-metal capacitor comprising the step of:

forming a first resistor material having a first temperature coefficient of resistivity on a surface of a substrate;

forming an insulating material atop the first resistor material;

patterning the insulating material to at least provide a capacitor dielectric on a portion of the first resistor material;

forming a second resistor material having a second temperature coefficient of resistivity which is different from the first temperature coefficient of resistivity over the first resistor material and the capacitor dielectric, with the proviso that the first temperature coefficient of resistivity and the second temperature coefficient of resistivity provide an effective coefficient of resistivity that is substantially 0 ppm/°C; and

patterning the first and second resistor materials to provide a thin film resistor and a capacitor, said capacitor including at least the capacitor dielectric.

16. The method of Claim 15 wherein the at least two resistor materials are different materials selected from the group consisting of Ta, TaN, Ti, TiN, W, and WN.

17. The method of Claim 15 wherein the at least two resistor materials comprise a first resistor material and a second resistor material.

18. The method of Claim 15 wherein the first resistor material is TiN and the second resistor material is TaN.